IN THE TITLE

Please replace the title of the invention with:

JOINT OPTIMIZATION OF SPEECH EXCITATION AND FILTER PARAMETERS

IN THE SPECIFICATION

Please replace page 3, lines 4-13, with:

One improvement upon above-mentioned solution is described in U.S. patent number 6,859,775 to Lashkari et al. This improvement describes an improved gradient search algorithm that may be used with iterative root searching algorithms. Briefly stated, the improved gradient search algorithm recalculates the gradient vector at each iteration of the optimization algorithm to take into account the variations of the decomposition coefficients with respect to the roots. Thus, the improved gradient search algorithm provides a better set of roots compared to algorithms that assume the decomposition coefficients are constant during successive iterations.

Please replace lines page 8, lines 9-23, with:

Conventionally, the coefficients $a_1 \ldots a_M$ of this polynomial are computed using a technique known in the art as linear predictive coding ("LPC"). LPC-based techniques compute the polynomial coefficients $a_1 \ldots a_M$ by minimizing the total prediction error E_p. Accordingly, the sample prediction error $e_p(n)$ is defined by the formula:

$$e_p(n) = s(n) + \sum_{k=1}^{M} a_k s(n-k) \qquad (4)$$

The total prediction error E_p is then defined by the formula:

$$E_p = \sum_{k=0}^{N-1} e_p^{\,2}(k) \qquad (5)$$

where N is the length of the analysis frame expressed in number of samples. The polynomial coefficients $a_1 \ldots a_M$ can now be computed by minimizing the total prediction error E_p using well known mathematical techniques.

Please replace lines page 15, lines 5-16, with:

The synthesis error gradient vector $\nabla_j E_s$ is now calculated by substituting formula (27) into formula (25) and formula (25) into formula (24). The updated root vector $\Lambda^{(j+1)}$ at the next iteration can then be calculated by substituting the result of formula (24) into formula (23). After the root vector $\Lambda^{(j)}$ is recalculated, the decomposition coefficients b_i are updated prior to the next iteration using formula (17). A detailed description of one algorithm for updating the decomposition coefficients is described in U.S. patent number 6,859,775 to Lashkari et al. (Attorney Docket No. 10745/20). The iterations of the gradient search algorithm are repeated until either the step-size becomes smaller than a predefined value μ_{min}, a predetermined number of iterations are completed, or the roots are resolved within a predetermined distance from the unit circle.